ATTACHMENT B

MAXIMIZING CONSUMER BENEFITS FROM BROADBAND

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January 9, 2010

CONTENTS

I. INTRODUCTION AND OVERVIEW

1. The Federal Communications Commission (Commission) has opened a proceeding in which the Commission seeks "public input on draft rules to preserve an open Internet."[1]

2. At the request of counsel for Verizon, I have conducted an economic analysis of the likely effects of the Commission's proposed rules on the consumer benefits derived from the broadband industry. That analysis reveals that the Commission's proposed rules would not maximize consumer benefits. Instead, the rules would very likely harm innovation, investment, competition, and, consequently, consumer welfare.

3. Briefly, my specific findings are the following:

- *The NPRM should seek comment on how to promote consumer welfare rather than how to preserve the current state of the Internet.* The *NPRM* seeks comment on how to preserve the current state of the Internet.[2] By seeking comment in this form, the Commission is implicitly making an unwarranted and unsupported assumption that trying to preserve a particular notion of the "open" Internet will serve consumer interests. Basing policy on this assumption rather than on a sound consumer-welfare analysis is a serious mistake that risks greatly harming consumers. If the Commission's objective is to promote consumer welfare, then the *NPRM* should be

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[1] Federal Communications Commission, Notice of Proposed Rulemaking, *Preserving the Open Internet; Broadband Industry Practices*, FCC 09-93, GN Docket No. 09-191, WC Docket No. 07-52 (rel. October 22, 2009) (hereinafter, *NPRM*), ¶ 2.

[2] The *NPRM* (*e.g.*, ¶¶ 3 and 17) expresses its goal in terms of "openness." However, as discussed below, it is evident from the proposed rules that, in fact, the objective is to preserve the status quo and favor certain classes of application provider.

seeking comment on how Commission policy toward the broadband industry can best promote consumer welfare.

- *The NPRM reflects an incorrect understanding of the past and current states of the Internet.* First, the *NPRM* implicitly assumes that a stylized and inaccurate perception of the current state of the Internet represents the best possibility for promoting consumer welfare now and in the future. Second, the *NPRM* implicitly assumes that there is a need for additional regulation to supplement the substantial body of existing antitrust and consumer protection regulation and case law.

- *Public policy should not stifle private innovation and investment in any sector of the broadband industry.*[3] Consumer welfare is highly dependent on the extent of innovation and investment in the broadband industry. To maximize consumer welfare, innovation and investment will have to come from all sectors of the broadband industry, including broadband networks. The vast majority of this innovation and investment will come from the private sector. It is thus vital to consumer welfare that public policy not stifle innovation and investment in various sectors of the broadband industry.

- *The Commission's fundamental approach to promoting consumer welfare in the broadband marketplace should be to promote and protect undistorted competition.*

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[3] Here, and throughout this declaration, I am not referring to innovation and investment in harmful or illegal services. Consumer welfare is enhanced when private-sector providers of legitimate services work with public-policy enforcers to reduce the success of harmful or illegal services.

No one knows the optimal structure of the broadband industry today, let alone what the optimal structure will be five or ten years from now. Rather than trying to impose a particular structure and vision on market participants, the Commission should adopt policies that promote undistorted competition. Doing so will best serve consumer interests because it will allow those interests (as expressed through market forces) to drive the services and applications that are commercially successful and, thus, are offered to consumers. In contrast to the *NPRM*'s proposed rules, a policy approach of promoting undistorted competition would allow the full expression of consumer desires and would allow providers to experiment with and implement a wide range of approaches as they seek to discover which business models most successfully serve consumer interests.

- *The Commission's proposed rules would distort competition and very likely harm innovation, investment, and consumer welfare.* The set of rules proposed in the *NPRM* would distort competition by skewing market outcomes in favor of certain providers or segments of the broadband industry. By preventing certain business models, pricing strategies, and the full use of network management techniques, these rules would distort the development of the industry, particularly by imposing restrictions on only one segment of the industry. That is, the proposed rules would block certain types of competition and thwart the efficient functioning of market forces. Consumer welfare would be better protected if the Commission allowed broadband service providers to manage their networks, offer differentiated services, and—if they so choose—implement sophisticated pricing strategies as they compete with one another.

Specifically, the proposed rules would harm consumer welfare through the following mechanisms:

— *The proposed rules would very likely distort and discourage network management that would otherwise benefit consumers.* Network management can facilitate more efficient use of capacity and can protect consumers from harmful traffic and applications. However, the proposed rules would create an uncertain regulatory environment that would discourage efficient network management. For example, the proposed rules allow for "reasonable" practices without defining reasonable. Moreover, any definition of reasonable would almost certainly either be vague or would draw bright lines that in important instances lead to outcomes that harmed consumer welfare.

— *The proposed rules would prevent "discrimination" that would otherwise benefit consumers.* The proposed rules are based on assumptions about the consumer-welfare effects of discrimination that lack a sound basis in either economic logic or marketplace facts. Although it is vital to the promotion of consumer welfare that network providers continue to be permitted to develop and offer their own services that may be thought of as managed or specialized, the *NRPM*'s managed services exception is vague and unworkable. Moreover, it cannot reasonably be expected to substitute for the sound analysis that is missing from the *NPRM*.

— *The proposed rules would distort competition and harm consumers.* The rules could harm consumers by seriously limiting and distorting competition in the choice of service offerings, pricing, and the nature of vertical relationships.

— *The proposed rules offer little or no incremental benefit over existing laws and regulations.* The potential incremental benefits of the *NPRM*'s proposed rules are diminished by the existence of state and federal antitrust and consumer protection policies of general applicability that already provide fundamental protections of competition and consumer welfare.

- *Applying the proposed rules to the wireless industry would significantly distort competition and risk harming consumers.* For the reasons summarized above and discussed in greater detail below, imposing the proposed rules on wireline broadband services would distort competition and harm consumers. Application of these rules to wireless broadband service providers poses an even greater threat to consumer welfare. This is so for at least three broad reasons:

  — *The wireless industry is competitive.* The Commission's own analysis of the wireless industry has indicated that "competition in mobile telecommunications markets is flourishing."[4] Clearly, the wireless industry very successfully offers a variety of wireless data and Internet

[4] Federal Communications Commission, "Thirteenth Report," *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, DA 09-54, WT Docket 08-27 (Terminated), (rel. January 16, 2009), ¶ 275.

access services. Given the strength of competition, there is relatively little reason to believe that pervasive regulatory intervention will improve market performance. Instead, applying the proposed rules to the wireless industry would very likely distort competition to consumers' detriment.

— *Wireless broadband requires significant ongoing investment.* Internet access providers offering both wireline and wireless broadband services continue to invest heavily in their networks, but the investment demands for wireless broadband service providers are particularly great as they have to deal with spectrum scarcity and the need to deploy new technology to meet the needs of growing numbers of subscribers and expanding mobile broadband usage.

— *Network management is especially valuable for wireless consumers.* Network management is important to the successful operation of any communications network. Network management is especially important for wireless networks. These networks face capacity constraints based on spectrum limitations. They also face complex operational issues (*e.g.*, many wireless networks have to handle interaction with millions of mobile transceivers). Consumers benefit when network operators are allowed to undertake network management without undue public policy restrictions. The resulting consumer benefits include improved security and protection from viruses, worms, and other malware.

4. The remainder of this declaration explains these findings in greater depth and provides details of the facts and analysis that led me to reach them.

II. THE *NPRM* MAKES TWO UNWARRANTED AND UNSUPPORTED ASSUMPTIONS

5. If the Commission's objective is to develop and implement policies that promote consumer welfare, then the *NPRM* should ask: How can Commission policy toward the broadband industry best promote consumer welfare? Instead, the *NPRM* asks how to preserve the current "open" Internet and proposes a set of rules intended to further that objective.[5] In doing so, the *NPRM* implicitly makes two unwarranted and unsupported assumptions:

- First, the *NPRM* implicitly assumes that a stylized and inaccurate perception of the current state of the Internet represents the best possible state for promoting consumer welfare now and in the future.
- Second, the *NPRM* implicitly assumes that there is a need for additional regulation to supplement the substantial body of existing antitrust and consumer protection regulation and case law.

6. It would be a serious mistake for the Commission to accept these two assumptions, and doing so would risk greatly harming consumers. Basing decisions on these assumptions would be antithetical to evidence-based policy making and would lead to policy conclusions that were not grounded in reality. Such policies would be very likely to have large unintended

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[5] *NPRM*, ¶ 16. ("In this Notice of Proposed Rulemaking, we seek comment on the best means of preserving a free and open Internet, however it is accessed, and draft proposals to achieve that end.")

consequences and would be very unlikely to maximize the consumer benefits derived from the broadband industry.

A. THE *NPRM* BUILDS ON AN INCORRECT VIEW OF THE INTERNET

7. The *NPRM* adopts a romanticized notion that the Internet is now—and always has been—completely free and totally open with no discrimination or restrictions on access. This view is incorrect.

8. According to the *NPRM,*

> Today's Internet embodies a legacy of openness and transparency that has been critical to the network's success as an engine for creativity, innovation, and economic growth[6]

and

> Because the Internet's creators did not know—and did not want to pre-determine—what would emerge and succeed on the network, they chose an architecture that did not favor particular applications.[7]

9. The issues are more nuanced than the *NPRM* recognizes. An examination of the facts reveals that the Internet has not been as "open" or "transparent" historically, or today, as the *NPRM* portrays. The facts show that: (a) the current Internet architecture clearly works better for some applications than for others; (b) not all traffic is treated equally; and (c) the Internet has not been built entirely on open business models.

10. Applications differ greatly in the requirements they place on a network. Some applications require little bandwidth and are not time sensitive, such as e-mail. Other applications require significant bandwidth but are not time sensitive, such as downloading

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6 *NPRM,* ¶ 17.

7 *NPRM,* ¶ 3.

software or (non-streaming) video. Still other applications are time sensitive and require significant bandwidth, such as high-quality videoconferencing. The speeds applications are projected to require in the near future range from a few kilobits per second for VoIP or music, to several megabits per second for streaming television or games, and up to twelve megabits per second for streaming high definition television.[8]

11. In the light of these differences among applications, it should not be surprising that the current Internet architecture favors some applications over others.[9] For example, the Internet works relatively poorly for applications that are highly sensitive to packet loss and require very low latency. It is commercially impractical to provide a network that can work optimally for every type of application.

12. One response to managing the variety of demands that different applications place on the network has been to allow the network to differentiate traffic. David Clark, a distinguished computer scientist who served as chief protocol architect of the Internet until its commercialization, was recently interviewed and discussed this point:

> "The network is not neutral and never has been," Clark said, dismissing as "happy little bunny rabbit dreams" the assumptions of net neutrality supporters that there was once a "Garden of Eden" for the Internet. NSFnet, an early part of the Internet backbone, gave priority to interactive traffic, he said: "You've

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[8] Robert Atkinson and Ivy Schultz, "Broadband in America, Where It Is and Where It Is Going (According to Broadband Service Providers), Preliminary Report Prepared for the Staff of the FCC's Omnibus Broadband Initiative," Columbia Institute for Tele-Information, November 11, 2009, *available at* http://www.broadband.gov/docs/Broadband_in_America.pdf, *site visited* January 6, 2010 (hereinafter *CITI*), at 51 (citing Forrester Research).

[9] In this regard, the Internet and the public switched telephone network (PSTN) have much in common. Both support a wide range of applications (*e.g.*, the PSTN supports voice telephony, fax, and data) but work better for some applications than others.

got to discriminate between good blocking and bad blocking."[10]

13. The designers of the Internet Protocol have recognized the value of treating different traffic differently. For example, Internet Protocol version 6 (IPv6) allowed differentiation to help meet the challenge of providing manageable quality of service for next-generation applications.[11] The specification for IPv6, released by the Internet Engineering Task Force in 1998, added the functionality to "enable the labeling of packets belonging to particular traffic 'flows' for which the sender requests special handling, such as non-default quality of service or 'real-time' service."[12] At the same time, the Internet Engineering Task Force also released "An Architecture for Differentiated Services," which defined "an architecture for implementing scalable service differentiation in the Internet" using IPv6.[13] This approach was contrasted with five other methods for differentiating traffic that were already part of Internet Protocol version 4.[14]

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10 Greg Piper, "Internet Architect Suggests 'Futures Market' to Avoid Policy Disputes," *Communications Daily*, **29**(23), February 5, 2009.

11 IPv6 Task Force, "Next Generation Applications Working Group Report," February 4, 2001, at 10 and 11.

12 S. Deering and R. Hinden, "Internet Protocol Version 6 (IPv6) Specification (RFC 2460)," Internet Engineering Task Force, The Internet Society, December 1998, *available at* http://tools.ietf.org/html/rfc2460, *site visited* January 6, 2010, at 2.

13 S. Blake, D. Black, M. Carlson, E. Davies, Z. Wang, and W. Weiss, "An Architecture for Differentiated Services (RFC 2475)," Internet Engineering Task Force, The Internet Society, December 1998, *available at* http://tools.ietf.org/html/rfc2475, *site visited* January 6, 2010, at 1.

14 The other methods of traffic differentiation discussed were "relative priority marking, service marking, label switching, Integrated Services/RSVP, and static per-hop classification." (S. Blake, D. Black, M. Carlson, E. Davies, Z. Wang, and W. Weiss, "An Architecture for Differentiated Services (RFC 2475)," Internet Engineering Task Force, The Internet Society, December 1998, *available at* http://tools.ietf.org/html/rfc2475, *site visited* January 6, 2010, at 9-11.)

14. The value of active network management is clearly evident from examination of the services that companies use in their private data networks.[15] Verizon and other providers of private data networks for enterprise business customers make available a wide range of options for prioritizing and differentiating between different types of traffic. For example, Verizon's private IP network services include the ability both to prioritize traffic based on type (*i.e.*, voice, video, or data) and to analyze traffic and manage bandwidth based on the application or even the particular packet.[16] It is my understanding that some customers choose not to prioritize any of their traffic, but many customers do choose to prioritize traffic, often in complex ways. The fact that customers pay for the ability to differentiate between traffic in managing their own internal networks demonstrates that users want and value such differentiation.

15. There are others ways in which some traffic is treated differently than other. Content delivery networks, such as Akamai and BitGravity, sell services that improve the speed and quality at which their customers' content can be accessed by end users. That is, content providers can and do pay for superior performance on the Internet, and have done so for many

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[15] For a general discussion of the importance of network management techniques to companies, see John Burke, "Do More with MPLS: Ensure Application Performance – Buy More Performance, Not More Bandwidth," Nemertes Research, *available at* http://www.business.att.com/enterprise/resource_item/Family/vpn-services-enterprise/network-based-vpn-enterprise/Whitepaper/do-more-with-mpls-ensure-application-performance-/, *site visited* December 4, 2009.

[16] See, Private IP Layer 3: Overview, *available at* http://www.verizonbusiness.com/products/data/privateip/#overview, *site visited* December 4, 2009.

years.[17] These networks improve performance by maintaining a large number of geographically diverse servers that connect to the Internet near end users' locations, thereby reducing the distance between customers and end users. Similarly, large content providers, such as Google, Microsoft, and Yahoo, each maintain server farms at geographically diverse locations.[18] A large content provider could also create a private network that connects to the Internet and allows the provider to enjoy higher quality transport of its packets than that available on the public Internet. Lastly, the exchange of traffic among networks is not all equal. For example, networks exchange traffic at both public access points, which are generally badly congested, and private access points in which networks invest to obtain superior service.

16. The differential treatment of traffic is not the only way in which the actual Internet has not conformed to the NPRM's idealized vision of openness. For example, AOL offered edited, controlled content and was very successful in competition with other ISPs that offered open, uncontrolled access.[19] An analysis of AOL conducted in 2001 drew an important conclusion from this fact:

> As the base of consumers attached to the Internet has broadened, so has the range of experiences sought by the consumers. In the competitive world of dial-up Internet access, the company that holds the major share of US

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17 For example, Akamai claims that it handles 15 to 20 percent of daily Web traffic. (See, Akamai Facts and Figures, *available at* http://www.akamai.com/html/about/facts_figures.html, *site visited* December 12, 2009.)

18 John Markoff and Saul Hansell, "Hiding in Plain Sight, Google Seeks More Power," *The New York Times*, June 14, 2006, *available at* http://www.nytimes.com/2006/06/14/technology/14search.html, *site visited* January 1, 2010.

19 See, for example, Walter Mossberg, "Personal Technology: On-Line Services," *The Wall Street Journal*, January 6, 1994, at B1.

> consumers is America Online, or AOL. One can speculate about the sorts of experience that consumers favor by looking at what AOL offers. AOL's emphasis is less on open and equal access to any activity and destination (what the end-to-end arguments call for), and more on packaged content (reinforced by the merger with Time Warner), predictable editorship, and control of unwelcome side-effects. AOL's growing subscribership attests to consumer valuation of the kind of service it offers and the comparative ease of use it provides. Those who call for one or another sort of Internet as a collective societal goal would do well to learn from the voice of the consumer as it has been heard so far.[20]

In other words, the fact that such "walled gardens" appeared and were so immensely popular demonstrates that there was consumer demand for them.

17. More recently, AOL and business models built on walled gardens for fixed-line Internet access have not fared as well. At the same time, however, providers of mobile wireless services have offered very popular managed user experiences, which offer greater ease of use, security, and protection of service quality while emphasizing particular functionalities that are particularly valuable to the end user (*e.g.*, music, email, and photographic capabilities) rather than an unlimited range of web applications. These facts demonstrate that consumers have a range of preferences, that these preferences can change over time, and that market forces—without regulation—can drive suppliers to meet those changing demands.

18. There is another important lesson that one can draw from AOL's experience: it is a mistake for regulators to attempt to freeze industry structure or impose a currently popular

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[20] Marjory S. Blumenthal and David D. Clark, "Rethinking the Design of the Internet: The End-to-End Arguments vs. the Brave New World," *ACM Transactions on Internet Technology*, **1**(1), August 2001, at 92, *available at* https://facultystaff.richmond.edu/~dszajda/classes/cs332/Spring_2006/papers/rethinking_end_to_end.pdf, *site visited* January 7, 2010.

business model through regulatory fiat. Suppose, for example, the Commission had observed AOL's tremendous success and popularity during the 1990s and mandated that all ISPs have policies similar to those of AOL. Consumers almost surely would have been harmed by such a mandate because their changing preferences could not have been satisfied in a market constricted by such regulation.

19. The *NPRM* apparently seeks to preserve the current structure of the broadband industry because of the belief that the Internet's success is due to its "openness and transparency."[21] The Internet manifestly has been a tremendous success. But the Internet is not now, and has never been, fully open. Moreover, many factors have contributed to the Internet's success. And it is certainly possible, or even likely, that the Internet could have been an even greater success with a different architecture (*e.g.*, one that more readily allowed for quality-of-service commitments). All of these facts demonstrate that it would be a mistake for the Commission to try to impose a particular vision of "openness."

20. More important, even if this notion were correct, it would not be in consumers' interest to ossify the Internet. This is so because no one knows the "best" structure for the Internet. Indeed, given the heterogeneity of consumer preferences, it is very unlikely that there is a single structure that is best for everyone. Because consumers have different preferences and those preferences change over time, and because technology is constantly evolving, it is important to allow a variety of approaches to be taken and for experimentation to take place. Instead of seeking to preserve or impose a particular structure, the Commission

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[21] *NPRM*, ¶ 17.

should be asking how public policy can best allow competitive market forces to shape the industry, which will lead to an industry that serves consumer interests.[22]

B. THE NPRM DOES NOT FULLY ACCOUNT FOR EXISTING LAWS AND REGULATIONS

21. A policy approach that sought to maximize consumer welfare would not presume that extensive Commission intervention is necessary or desirable. Even if one believed that the Commission's proposed rules embodied reasonable goals for how the industry would ideally operate, it does not follow that these rules should be imposed. First, forbearance is warranted except where it can be shown the actions violating these rules are anticompetitive. To do otherwise runs a substantial risk of blocking valuable experimentation and efficiency-enhancing business practices that would serve consumer interests. Second, the rules should not be implemented before demonstrating that there is a need for such rules to supplement existing antitrust and consumer protection enforcement regimes. It is well documented that even well-intentioned regulations can impose significant costs and often have harmful unintended consequences.[23] Given that the proposed rules would inevitably have costs, it is

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[22] By adopting the goal of preserving the current structure of the Internet, the Commission risks confusing provider welfare with consumer welfare. Clearly, some firms benefit from the current structure. But the goal of communications policy is to promote consumer welfare, not the profits of certain service or application providers.

The importance of the distinction between protecting competition and protecting competitors is discussed in Michael L. Katz, "Investment, Innovation, and Competition in the Provision of Broadband Infrastructure," declaration attached to Comments of Verizon, Inc., *In the Matter of A National Broadband Plan for our Future*, GN Docket No. 09-51, June 8, 2009, (hereinafter, *Katz Broadband Declaration*), § V.

[23] Examples of unintended harmful effects from regulation include:

- Rate of return regulation, from which regulators have largely moved away because of concerns about inefficient production, overcapitalization, and negative effects on quality

important to establish that the rules would have significant benefits that would outweigh these costs.

22. The treatment of anticompetitive foreclosure by a broadband Internet access provider that is vertically integrated into applications offers an excellent illustration of these issues. As some proponents of network neutrality regulation have argued, there are conditions under which an integrated supplier with significant market power will find it profitable to use that market power to exclude rival application providers, harming competition and consumers. However, it is far from a foregone conclusion that such an integrated service provider will engage in such exclusion[24] or that instances in which a vertically integrated supplier appears to favor its own applications are anticompetitive.[25] The *NPRM* cites no evidence that there is a widespread problem of anticompetitive foreclosure by broadband Internet access

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and new service offerings. (Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization* (Fourth Edition), 2005, at 707-714.)

- The stringent conditions intended to promote public safety radio that were attached to the D Block in the 700 MHz auction. The bids did not reach the reserve price, and the Commission has instituted a new proceeding to modify the requirements and reduce the reserve price. (Federal Communications Commission, Second Further Notice of Proposed Rulemaking, WT Docket No. 06-150, May 14, 2008.) Consequently, the conditions did not promote public safety radio and the failure to auction the spectrum rights is likely to lead to substantial delays in the introduction of services using this spectrum.
- Food labeling has had little success in changing diets. For example, reduced consumption of one high-fat food is frequently offset by increased consumption of another high-fat food. (See Omri Ben-Shahar and Carl Schneider, "The Failure of Mandated Disclosure," University of Chicago Working Paper, Fall 2009, at 22.)

[24] Joseph Farrell and Phil Weiser (2003), "Modularity, Vertical Integration, and Open Access Policies: Towards a Convergence of Antitrust and Regulation in the Internet Age," *Harvard Journal of Law and Technology*, **17**(1), *available at* http://jolt.law.harvard.edu/articles/pdf/v17/17HarvJLTech085.pdf, *site visited* January 7, 2010.

[25] Instead, such favoritism may actually reflect efficiency benefits of greater coordination facilitated by integration that result in higher levels of consumer welfare.

providers.[26] And I am unaware of any evidence indicating that current public policies, including antitrust enforcement, are not up to the task of preventing anticompetitive foreclosure. Hence, although absent any public policy constraints some vertically integrated broadband Internet access providers could, in theory, find anticompetitive foreclosure to be profitable, there is no reason to expect that the benefits of additional regulations targeted specifically at such practices would promote, rather than harm, consumer welfare.

III. THE COMMISSION'S FUNDAMENTAL APPROACH TO PROMOTING CONSUMER WELFARE IN THE BROADBAND INDUSTRY SHOULD BE TO PROMOTE AND PROTECT UNDISTORTED COMPETITION

23. If the Commission's objective is to develop and implement policies that promote consumer welfare, then the *NPRM* should seek comment on the following question: How can Commission policy toward the broadband industry best promote consumer welfare? As I now discuss, the answer is: promote and protect undistorted competition.

24. In recent decades, the Commission has overseen a fundamental shift in telecommunications policy from an approach that created and regulated monopolies to one that promotes competition and relies on market forces to "regulate" provider behavior. This shift has given rise to tremendous consumer benefits in a wide range of services, including long distance telephony, multichannel video distribution, and mobile wireless voice and data

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[26] The *NPRM* (¶ 50) points to only two incidents in which the Commission perceived the need to take action against an Internet service provider's blocking or degrading of traffic. Moreover, in 2007, a staff report of the Federal Trade Commission stated that "to date we are unaware of any significant market failure or demonstrated consumer harm from conduct by broadband providers." (Federal Trade Commission, "Broadband Connectivity Competition Policy," Staff Report, June 2007, *available at* http://www.ftc.gov/reports/broadband/v070000report.pdf, *site visited* January 7, 2010, at 11.)

services. With appropriate public policies in place, competition will continue to generate consumer benefits in the broadband marketplace in the form of lower prices, greater variety, and higher product and service quality.

A. PRIVATE INVESTMENT AND INNOVATION IN BROADBAND NETWORKS ARE VITAL TO CONSUMER WELFARE

25. Absent the significant past investment in networks, consumers would not enjoy today the tremendous benefits that applications and services on the Internet generate. And absent continued investments in infrastructure and innovation, consumers will not see the continued rapid growth of those benefits. That investment and innovation will have to come primarily from the private sector. It thus is vital not to stifle private investment and innovation.

26. There has been tremendous innovation and investment both at the edge and in the core of networks.[27] The parallel paths are not a coincidence. Internet services are an example of a systems service or product—consumer benefits are generated when several different components (*e.g.*, network equipment and protocols, personal computers or wireless handsets, and applications) are used together. Each of these components interacts with, and depends upon, other components in the system. For example, applications that make intensive use of bandwidth, such as streaming video, require networks that are capable of providing the bandwidth, operating systems that are capable of processing the data, and hardware that is

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[27] For a discussion of wireless innovation and investment, see Michael L. Katz, "Public Policy Principles for Promoting Efficient Wireless Innovation and Investment," Attachment to Comments of AT&T, Inc., *Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan For Our Future*, GN Docket Nos. 09-157, FCC 09-51, September 30, 2009, *available at* http://www.att.com/Common/about_us/public_policy/fcc_wireless_noi/Paper-Katz.pdf, *site visited* January 7, 2010 (hereinafter, *Katz Innovation White Paper*).

capable of displaying the output. It should also be recognized that the investment in core networks necessary to support edge innovation is not limited to increased capacity. For example, AT&T had to make several investments in its network hardware and software to support the introduction of the Apple iPhone.[28] And IPv6 allows for several improvements in core network performance that would enable new or improved applications.[29]

27. Broadband service providers have invested tens of billions of dollars in both fixed and mobile access networks and will have to continue investing large amounts of capital to meet growing customer demands and public policy objectives. New applications and new types of access devices (*e.g.*, smartphones), as well as increases in the numbers of users and access devices, will continue to place increasing demands on broadband access networks. Similarly, downloading of video over the Internet, particularly high definition video, is expected to increase. These new applications and video downloads are expected to require significant amounts of bandwidth.[30]

28. In its recent survey of "publicly announced broadband network deployments (both new and upgraded networks) of companies in the United States,"[31] the Columbia Institute for Tele-Information (CITI) summarized investment in new and upgraded broadband networks in the U.S. as follows:

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28 *Katz Innovation White Paper*, ¶ 50.

29 Ger van den Broek, "Next Generation Applications Working Group Report," IPv6 Task Force, February 4, 2001, *available at* http://www.eu.ipv6tf.org/PublicDocuments/IPv6TF-Apps.pdf, *site visited* December 12, 2009, at 3.

30 See, for example, *CITI* at 51 (citing Forrester Research) and Federal Trade Commission, "Broadband Connectivity Competition Policy," Staff Report, June 2007, at 27.

31 *CITI* at 5.

> Overall, broadband capex is high, at about $30 billion per year, which is about $100 per capita, or $300 per household. Over the six years 2010-2015, this will account for $182 billion of additional investment. Adding previous investments in broadband over the past five years, and also including the payments for spectrum licenses, would suggest that network operators will spend several hundreds of billions of dollars for broadband infrastructure in a ten year period.[32]

29. The National Broadband Plan has estimated that the incremental cost of providing 10-30 megabits per second (Mbps) broadband access to all U.S. households would be $50 billion, and the incremental cost of providing 100+ Mbps speeds would be $350 billion.[33]

30. In summary, consumers will enjoy the full potential benefits of services provided by the broadband industry only if there is significant continuing investment in access networks. There is widespread agreement that the vast majority of investment in innovation and facilities in the U.S. broadband industry will be made by private parties, who will be motivated by the prospect of profits generated by those investments. All else equal, the greater the expected financial return from a given level of investment, the greater are the incentives to undertake that investment. Conversely, public policies that reduce the financial returns to investment weaken private investment incentives. Thus, it is essential to consumer welfare that public policies do not harm private investment incentives. These considerations are especially important in the light of the fact that many investments in broadband networks involve large sunk costs and highly uncertain returns.

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[32] *CITI* at 68 and 69 [Internal footnotes omitted].

[33] Federal Communications Commission, "September Commission Meeting," September 29, 2009, *available at* http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0929/DOC-293742A1.pdf, *site visited* January 7, 2010, at 45.

B. DISTORTING COMPETITION TO FAVOR CERTAIN BUSINESS MODELS, COMPANIES, OR SECTORS WITHIN THE BROADBAND INDUSTRY WILL HARM CONSUMERS

31. As just stated, public policies promote consumer welfare when they create an economic environment in which firms have incentives to engage in investment and innovation that satisfy consumer demands. Given the complexity, variety, and changing nature of consumer demands, this is best done by promoting undistorted competition. Public policies that attempt to dictate the course of market evolution are unlikely to serve consumer interests.

32. Market experience demonstrates that consumers differ widely in the importance that they attach to different characteristics of their Internet experience. Some customers prefer a "walled garden" approach with strong security and edited content, while others prefer a simple pipe. Some customers prefer to make use of bandwidth intensive applications such as streaming media, while other customers prefer to use their service for e-mail and other applications that require relatively little bandwidth.[34]

33. Well-informed consumers are the best judges of their own preferences. Given the diversity of consumer preferences in the broadband user population, consumer welfare is maximized when consumers are free to choose from among a range of different types of user experience. Of course, it is not efficient to offer every conceivable type of user experience—

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[34] The United States Department of Justice has noted that consumers have a wide range of demands for speeds depending, in part, on the applications they use. (United States Department of Justice, *Ex Parte* Submission, *In the Matter of Economic Issues in Broadband Competition A National Broadband Plan for Our Future,* GN Docket No. 09-51, January 4, 2010 (hereinafter, *Justice Department Ex Parte Submission*), § II.B.)

at some point, the cost of additional variety outweighs the benefit. Market forces can better determine the range of experiences to offer consumers than can regulators.

34. In response to competitive pressures and consumer demands, broadband providers of fixed access offer a range of speeds, while wireless broadband service providers offer a variety of speeds, access devices, and applications. Providers also offer a variety of business models, with varying degrees of integration between content, access devices, and access services.[35] For example, Amazon promotes the simplicity of its bundled offering, the Kindle reader, by stating that there are "No monthly wireless bills, data plans, or commitments. Amazon pays for Kindle's wireless connectivity so you won't see a wireless bill."[36] As this nascent industry continues to develop, new business models will almost certainly be deployed involving varying degrees of bundling and integration among applications, access devices, and access services.

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[35] Internet access has long been characterized by a variety of approaches. In the early years of widespread Internet access, for example, Internet service providers offered a variety of models ranging from the provision of significant amounts of proprietary content (AOL, CompuServe, and Prodigy) to the provision of little more than a dial-up pipe (SmartLink). These offerings evolved over time, and individual firms sometimes offered multiple types of service in attempts to appeal to a range of consumers. For example, CompuServe, in addition to its primary service offering with edited content, experimented with a service named WOW!, aimed at novice on-line users, and with Spryte, a low-cost, no-frills Internet service. AOL similarly started a separate service called Global Network Navigator that offered only no-frills Internet access. (Walter Mossberg, "Personal Technology: On-Line Services," *The Wall Street Journal*, January 6, 1994, at B1; Jared Sandberg and Bart Ziegler, "Web Trap: Internet's Popularity Threatens to Swamp the On-Line Services – Millions of Users Bypass AOL and Others to Connect," *The Wall Street Journal*, January 18, 1996, at A1.)

[36] Amazon, "Wireless, Whispernet and Whispersync," *available at* http://www.amazon.com/gp/help/customer/display.html/ref=help_search_1-2?ie=UTF8&nodeId=200375910&qid=1261384011&sr=1-2#cost, *site visited* January 7, 2010.

35. In a competitive marketplace, those companies that satisfy consumers' needs and desires earn greater financial returns than those that do not. Competition thus drives firms to act to the benefit of consumers and can play an important role both in promoting innovation and investment and in ensuring that the benefits of that innovation and investment accrue to consumers. It follows that policies that protect competition serve to promote consumer welfare. It also follows that policies that distort competition generally harm consumer welfare.

36. Public policy is very unlikely to serve consumer interests when it substitutes regulatory mandates for access providers' business judgments regarding which products to offer consumers and what business models to pursue, including the degree of network management or openness. One important reason why relying on competitive market forces is superior to regulatory fiat is that regulators almost inevitably lack the information necessary to determine which supplier actions will maximize consumer welfare. Network management provides a prime example. The complexity of network management makes it impossible for the Commission to determine the most efficient management practices. This conclusion is not a criticism of the Commission's abilities but rather a statement about the difficulty of the management problem. No one can say with certainty what the best approach is, including the firms themselves, which is why we observe a variety of practices as firms seek to find the best approach for their particular circumstances. First, there may not be a single approach that is optimal in all circumstances. Second, even if there were a unique optimal approach, at present no one may know for certain what it is. Instead, different entities have different views and opinions based on different experiences, skills, information, and analyses.

37. Like the Commission, network operators face a problem that is too difficult to solve with certainty. But this is precisely why consumer welfare is best promoted by relying on competitive market forces. In the absence of restrictive regulations, suppliers in a competitive market will experiment with a diverse array of approaches, and those approaches that are most successful at creating consumer value will prevail. Those network providers that adopt inefficient network management practices (or practices that consumers find objectionable) will face pressures to change and will suffer adverse commercial consequences if they do not.

38. Public policy is also very unlikely to serve consumer interests when it favors some sectors of the broadband industry over others, say by forcing one sector to abide by rules designed to make another sector's business models more profitable. Instead, consumer interests are best served by public policies that promote undistorted competition in all sectors of the broadband industry.

39. In summary, the broadband industry today offers consumers a wide range of experiences on both the wireline and wireless sides. The wide array of choices available benefits consumers, both by offering a range of options that satisfy varied consumer demand today and by allowing for the testing of alternative approaches (including different revenue models and choices about the degree of integration) to see which will be the most successful in meeting consumer demands in the future. Regulatory policy that mandates a specific model of openness would, in critical respects, reduce consumers' choices, both today and in the future. To further its goal of promoting innovation, investment, and consumer welfare, the Commission thus should adopt policies that promote and protect the competitive process,

allowing consumer preferences to determine winners and losers in a marketplace characterized by undistorted competition.

IV. APPLICATION OF THE PROPOSED RULES WOULD VERY LIKELY HARM CONSUMERS

40. The *NPRM* proposes that all providers of broadband Internet access service must comply with the following six rules:[37]

1. Subject to reasonable network management, a provider of broadband Internet access service may not prevent any of its users from sending or receiving the lawful content of the user's choice over the Internet.

2. Subject to reasonable network management, a provider of broadband Internet access service may not prevent any of its users from running the lawful applications or using the lawful services of the user's choice.

3. Subject to reasonable network management, a provider of broadband Internet access service may not prevent any of its users from connecting to and using on its network the user's choice of lawful devices that do not harm the network.

4. Subject to reasonable network management, a provider of broadband Internet access service may not deprive any of its users of the user's entitlement to competition among network providers, application providers, service providers, and content providers.

5. Subject to reasonable network management, a provider of broadband Internet access service must treat lawful content, applications, and services in a nondiscriminatory manner.

6. Subject to reasonable network management, a provider of broadband Internet access service must disclose such information concerning network management and other practices as is reasonably required for users and content, application, and service providers to enjoy the protections specified in this part.

41. These proposed rules have several critical problems in common. First, the rules would harm consumers by distorting competition. Second, the rules would create unnecessary

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[37] *NPRM,* Appendix A.

uncertainty that would attenuate investment incentives. Lastly, the rules offer little prospect of consumer benefit in the light of existing legal protections, including antitrust and consumer protection laws. In short, implementation of the proposed rules would generate costs without generating offsetting benefits.

A. IMPLEMENTATION OF THE PROPOSED RULES WOULD LIKELY DISTORT AND DISCOURAGE NETWORK MANAGEMENT THAT WOULD OTHERWISE BENEFIT CONSUMERS

42. Network management generates important consumer benefits. The proposed rules would very likely reduce the use of network management and the resulting realization of consumer benefits.

1. Network management can facilitate more efficient use of capacity.

43. Broadband access networks are subject to congestion. In a mobile wireless network, each cell has a limited amount of spectrum that must be shared among a varying number of users. When a mobile wireless network becomes congested, service speeds decline and calls may be dropped. Similarly, wireline networks typically are structured so that users in a neighborhood share a limited amount of bandwidth. Comcast describes a portion of their hybrid fiber-coax network as follows: "on average, about 275 cable modems share the same downstream port and about 100 cable modems share the same upstream port. Both types of ports can experience congestion that could degrade the broadband experience of our subscribers."[38]

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[38] Comcast Corporation, "Description of Planned Network Management Practices to be Deployed Following the Termination of Current Practices," Attachment B to Letter from Kathryn A. Zachem to Marlene H. Dortch, *available at*

44. It is costly to increase capacity.[39] For a wireless network, capacity can be increased only by adding additional cell sites (which can be difficult in high-density areas with stringent zoning restrictions), obtaining usage rights for additional spectrum, or upgrading the electronics. The National Broadband Plan has estimated that the average incremental cost per subscriber to provide maximum-capacity 4G wireless is $900.[40] For wireline networks, increasing bandwidth requires installing new electronics at both ends of the connection, or, if that is insufficient, replacing the connection itself (*e.g.*, opening a trench and replacing the existing wire or stringing new cable for an aerial deployment). The National Broadband Plan has estimated that the average incremental cost per subscriber for a fully developed broadband deployment is $2,700 for fiber, $750 for hybrid fiber/coaxial cable, and $1,200 for DSL.[41] Even for an existing broadband cable Internet access subscribers, an upgrade to DOCSIS 3.0 has been estimated at a range of $70 to $100 per household.[42]

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http://downloads.comcast.net/docs/Attachment_B_Future_Practices.pdf, *site visited* January 7, 2010, at 4.

39 This is one of the reasons that access network owners are investing tens of billions of dollars annually. See Section III.A above.

40 Federal Communications Commission, "September Commission Meeting," September 29, 2009, *available at* http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0929/DOC-293742A1.pdf, *site visited* January 7, 2010, at 43.

Moreover, 4G electronics are close to attaining the theoretical maximum for spectrum efficiency at the link level. (Kevin Fitchard, "Shannon's specter," *Telephony Online*, May 21, 2007, *available at* http://telephonyonline.com/mag/telecom_shannons_specter/, *site visited* January 7, 2010.)

41 Federal Communications Commission, "September Commission Meeting," September 29, 2009, *available at* http://www.fcc.gov/Daily_Releases/Daily_Business/2009/db0929/DOC-293742A1.pdf, *site visited* January 7, 2010, at 43.

42 *CITI* at 22.

45. Capacity is a scarce resource. When an end user utilizes a high-bandwidth application, the user ties up capacity and impose costs on other users and application providers in both the short and long runs. In the short run, high-bandwidth applications contribute to network congestion, degrading the service available to other end users and applications providers.[43] In the long run, high-bandwidth applications trigger the need for additional capacity investment, which triggers costs that generally are borne by all broadband users. Consequently, consumers have a collective interest in seeing that a small segment of users does not generate large congestion and monetary costs for everyone else.

46. There are several alternatives for managing capacity in order to promote overall consumer welfare, including:

- A network could place caps on individual users to prevent a subset of users from hogging bandwidth and degrading the experiences of other users. For example, Comcast's revised network management practices call for the creation of two categories of traffic. During periods of congestion, those users contributing most heavily to the congestion would have their traffic shifted to the lower priority traffic category.[44]

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[43] The experience of AT&T's wireless network appears to be an example of high-volume users' imposing negative congestion externalities on other users. AT&T has been criticized for network congestion, and the company has indicated that three percent of its smartphone customers generate 40 percent of its total wireless data traffic. (Jenna Wortham, "AT&T to Urge Customers to Use Less Wireless Data," *The New York Times*, December 10, 2009, *available at* http://www.nytimes.com/2009/12/10/technology/companies/10iphone.html, *site visited* January 7, 2010.)

[44] Comcast Corporation, "Description of Planned Network Management Practices to be Deployed Following the Termination of Current Practices," Attachment B to Letter from

- A network could place limits on application behavior. For example, a location application that pings a mobile network constantly will, if widely used, overwhelm network, resulting in degraded service for other users. Network management can be used to limit such applications.

- A network could prioritize packets within the IP packet flow. It is my understanding that large enterprises' private networks frequently take advantage of such capabilities.

- A network that used shared data pipes (*e.g.*, data, voice, and video) could engage in dynamic capacity allocation across services. For example, a customer streaming two high definition movies using video on demand might have less capacity available for Internet access.

47. Network management practices and traffic-sensitive pricing can promote efficiency by limiting the extent to which specific users and applications are able to "hog" scarce capacity and/or by inducing end users to consider the costs of the messages they are sending and applications they are using.[45] In this way, these practices can create demand for applications that make efficient use of bandwidth (say by implementing compression techniques). Stated another way, network management is a consumer-friendly (partial) substitute for costly capacity additions.

Kathryn A. Zachem to Marlene H. Dortch, *available at* http://downloads.comcast.net/docs/Attachment_B_Future_Practices.pdf, *site visited* January 7, 2010, at 2.

[45] Under many conceptions of fairness, network management practices and traffic-sensitive pricing also promote fair outcomes by linking costs to benefits and ensuring that a few users to do not benefit at the expense of many.

48. In this regard, it is important to debunk the false argument that limiting network management is a good thing because it promotes additional investment. There are at least two fundamental flaws in such an argument.[46] First, a policy that triggered capacity investment in lieu of capacity management would be inefficient. Because a managed network can provide greater levels of service for a given amount of investment in physical infrastructure than can an unmanaged network, a managed network provides services at a lower unit cost. A second fundamental flaw with the argument that a policy that blocks network management can promote investment is that such a policy might actually reduce the overall amount of capacity investment. Restrictions on an operator's management of its network will prevent the operator from producing as much output as possible from any given amount of physical plant and equipment. Because the physical plant cannot be used efficiently, the cost of capacity per unit of output is higher. These higher costs reduce the operator's net return on investment and, consequently, the operator may invest less in physical capacity.[47] In summary, any intuitive appeal of this argument is deceiving; a public policy that restricted network management practices would not only be inefficient but could also have the opposite of its intended effect. The ultimate result would be to increase the costs of a given amount of effective capacity and to reduce the availability of broadband services to consumers.

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46 These points are discussed in greater detail in *Katz Broadband White Paper*, ¶¶ 31-34.

47 In *Katz Broadband Declaration* (at note 14), I provide a simple algebraic model that illustrates the harms of public policy limitations on network management practices by establishing conditions under such policies will reduce total output, raise the costs per unit of output, and lead to less investment in capacity.

49. Lastly, it should be recognized that network management of capacity and use is not simply a matter of restricting applications that impose costs on networks, other applications, and end users. Network management can also enable beneficial services. Consumers of applications (*e.g.*, streaming high-definition video or certain health applications with high quality-of-service needs) that require high-quality network performance would be harmed by limitations on network management that made it harder for networks to offer the services that these applications require.

2. Network management can protect consumers from harmful traffic and applications.

50. Some traffic and applications are harmful to consumers, and network management can play an important role in protecting consumers from such traffic and applications. Specifically, there are security threats that can be more effectively or efficiently addressed by the core network than the edges:

- *Denial of service attacks.* There are many hijacked personal computers at the edge of Internet because of the lack of consistent, high-level security at the edge. A non-compromised device at the edge of the network cannot defend itself from a denial of service attack because its access link becomes saturated by the attack before the traffic even reaches the edge device. Network managers, however, may be able to address the problem at multiple levels, including both the originating and terminating access networks.

- *Spam.* An Internet service provider may block port 25 in order to stop compromised computers at the edge from being used as spam relays.[48] This is an important benefit as it has been estimated that as many as 80 percent of all spam messages are passed through by compromised computers without the knowledge of their owners.[49]

- *Malware distribution.* Internet service providers may also be able to take actions to slow the spread of malicious software. For example, the Code Red Worm was released in 2001 and was spread via inbound port 80. Several major Internet service providers took steps to slow the spread of the worm by blocking incoming port 80 traffic except to sites that were known to be web servers.

3. The proposed rules would discourage efficient network management.

51. As just discussed, network management can play a valuable and important role in promoting the consumer benefits derived from the broadband industry. The *NPRM* states that the proposed rules are intended to allow reasonable network management and explicitly exclude illegal content from protection. Critically, however, the *NPRM* offers only a very vague and circular definition of "reasonable":

> *Reasonable network management consists of: (a) reasonable practices employed by a provider of broadband Internet access service to (i) reduce or*

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48 This practice is recommended by the U.S. Federal Trade Commission ("Operation Spam Zombies," *available at* http://www.ftc.gov/bcp/edu/microsites/spam/zombie/index.htm, *site visited* January 7, 2010) and the Messaging Anti-Abuse Working Group ("Managing Port 25 for Residential or Dynamic IP Space Benefits of Adoption and Risks of Inaction," *available at* http://www.maawg.org/port25/MAAWG_Port25rec0511.pdf, *site visited* January 1, 2010).

49 Messaging Anti-Abuse Working Group, "Managing Port 25 for Residential or Dynamic IP Space Benefits of Adoption and Risks of Inaction," *available at* http://www.maawg.org/port25/MAAWG_Port25rec0511.pdf, *site visited* January 1, 2010.

> *mitigate the effects of congestion on its network or to address quality-of-service concerns; (ii) address traffic that is unwanted by users or harmful; (iii) prevent the transfer of unlawful content; or (iv) prevent the unlawful transfer of content; and (b) other reasonable network management practices.*[50]

Although it lists a range of possible network management techniques and notes their potentially pro-competitive effects, the *NPRM* declines to say that any of them are "reasonable."[51]

52. In the absence of a meaningful definition of reasonableness, network operators are left to guess what the rules mean in practice.[52] For example, a wireless network might prohibit applications that hold on to a scarce data channel without actively using it.[53] Would the Commission consider such a practice to be reasonable? Or would the Commission instead find the practice to be discriminatory or (if the application were integrated into a specific access device) a violation of the rule requiring that all devices be allowed to connect to the network? Similarly, a location application that pings a mobile network constantly could, if widely used, create congestion that degrades service for other users. Would network operators be allowed to block such an application?

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50 *NPRM*, ¶ 135.

51 *NPRM*, ¶ 137.

52 As will be discussed shortly, this problem cannot be fixed simply by offering a precise definition of reasonable.

53 A cell site can simultaneously sustain only a limited number of radio links to users. It is my understanding that it is possible for an application to trickle just enough data that a link is held open and always available for that application. The effect is to block any other user from accessing that radio link even if the original application is making very little actual use of it except to hold on to it.

53. Turning to network management aimed at protecting consumers from harmful traffic and applications, there are many different issues that would likely arise. For example, spam filters are not perfectly accurate; they often filter out some legitimate or desired messages. To what extent would a service provider with a less-than-perfect filter be guilty of violating the Commission's rules? And how would the rules determine what constituted spam? For example, if Vonage ran a "spam" campaign advertising its VoIP service, and those e-mails were blocked by Verizon's spam filtering system, would Verizon be subject to disciplinary action by the Commission? More generally, harmful applications are not necessarily illegal applications. Would carriers have to justify every attempt to exclude or limit an application? The proposed rules invite endless fights over the definition of "harmful."

54. Given the myriad questions associated with the rules, in general, and the inability to know what may eventually be considered reasonable after the fact, in particular, a network operator would face considerable uncertainty and the risk of regulatory sanction or regulation-imposed costs when implementing network management practices. The *NPRM* states that "Providers would not be required to seek a declaratory ruling from the Commission before a practice is actually deployed, but they or others would be free to do so."[54] However, a network manager would risk sanctions by implementing a new network management practice without first applying for clearance from the Commission.[55] And such approval proceedings

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[54] *NPRM*, ¶ 134.

[55] The Commission's definitions provide no guidance because the definition of "reasonable network management," does not give a single example of a practice that is "reasonable," and the definition itself is circular, containing a clause for other "reasonable" practices. (*NPRM*, ¶¶ 137, 150.)

can be time-consuming and expensive. The likely effect of the Commission's proposed rules would be to harm consumers and economic efficiency by discouraging the use of otherwise beneficial network management.

55. A proponent of regulation might argue that these ill effects could be avoided by implementing (at least as a transitional measure) a policy that imposed no fines for first offenses. Such a policy would, however, have several failings. First, an adverse ruling by the Commission could trigger substantial costs other than fines. Suppose, for instance, that the Commission found that a practice violated its rules and demanded that the network operator change the practice. The operator might still face substantial costs if its network had been designed in a way that relied on the practice or if the operator had made substantial investments in equipment to implement the practice. There would also a difficult issue of how a network operator would be treated if the Commission found that a second network management practice by that operator violated the Commission's rules. Would the second practice constitute of new "first offense," or would the network be considered a repeat offender? If the former, there would be a possibility of network operators' gaming the rules by introducing a long series of different practices. If the latter, then the harmful, chilling effects discussed in the preceding paragraph would be in force. The predictable result will be to discourage network management practices, practices that might otherwise promote consumer welfare and efficiency.

56. The ill effects of the proposed rules cannot be fixed simply by offering a precise definition of reasonable. Any definition that drew bright lines would almost certainly lead to importance instances in which the effect was to distort competition and harm consumer

welfare. Given the current state of the marketplace, it is impossible to develop a definition that would reliably and predictably distinguish network management practices that harm competition and consumer welfare from those practices that promote competition and consumer welfare. Consumers, access providers, and applications providers are heterogeneous, making the problem a highly complex one. Moreover, future technological developments, business models, and consumer demand are all changing rapidly and highly uncertain. The likelihood of developing a definition that would promote consumer welfare is further reduced by the Commission's lack of experience with respect to how various regulatory policies affect broadband service providers and consumers.

57. Public policy should aim to promote competition and encourage efficient investment, innovation, and experimentation that provide consumers with additional choices. That innovation and experimentation should include network management practices. Case-by-case application of antitrust laws is the best way to deal with concerns that, in some circumstances, network management can be used to harm competition. Such an approach is the only way to block the use of these practices when they harm competition and consumers while at the same time ensuring that service providers can engage in these practices in the many instances where they benefit consumers and promote competition and the achievement of other public-interest goals.

58. Consideration of an antitrust approach raises the question of whether the Commission could successfully state a vague principle or concept (*e.g.*, reasonable network management) and then refine the meaning through case-by-case adjudication? The answer is very likely no. In stark contrast to antitrust enforcement, network operators would not have an extensive case

history on which to rely. Thus, the chilling effects of such approach on otherwise beneficial network management practices could be substantial.

B. THE RULES WOULD PREVENT "DISCRIMINATION" THAT BENEFITS CONSUMERS.

59. In the *NPRM*, the Commission asserts that "[t]he key issue we face is distinguishing socially beneficial discrimination from socially harmful discrimination in a workable manner."[56] Yet it is apparent from the *NPRM* that the Commission has not, to date, undertaken any meaningful effort to distinguish socially beneficial discrimination from socially harmful discrimination in any manner, let alone a workable one.

60. Instead of conducting any sort of sound analysis, the *NPRM* asserts that "[b]ased on the record, we propose a general rule prohibiting a broadband Internet access service provider from discriminating against, or in favor of, any content, application, or service, subject to reasonable network management."[57] Examination of the sources cited by the Commission in support of its proposed rule reveals that they do not, in fact, provide a sound foundation for that rule. The comments cited by the Commission: discuss the Madison River case; assert the exercise of market power in special access; claim that Verizon Wireless has blocked VoIP and iTunes to favor its own voice and music services; argue that there is little prospect for competition in access; and assert that the market has already spoken in favor of nondiscriminatory access by turning away from "walled gardens" such as AOL, Genie,

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56 *NPRM*, ¶103 [Internal footnote omitted].

57 *NPRM*, ¶104 [Internal footnote omitted].

Delphi, Prodigy, and Compuserve.[58] *Even if all of these assertions were correct*, which is far from evident, they would not establish that the *NPRM*'s proposed rule against discrimination would promote consumer welfare. In fact, these assertions contribute nothing toward "distinguishing socially beneficial discrimination from socially harmful discrimination in a workable manner."[59]

61. An appropriate analysis would build on the fact that discrimination does not harm consumer welfare or competition merely because it may reduce the profits of a particular competitor.[60] Instead of examining competitor welfare, the analysis would focus on the effects of discrimination on the competitive process and on the resulting level of consumer welfare, recognizing that the competitive and welfare effects of discrimination can vary by the type of discrimination and the market setting in which it is practiced. Neither the sources cited by the *NPRM* nor the *NPRM* itself offers such an analysis.

62. The lack of analysis in the *NPRM* or the sources on which it relies is deeply troubling because, as the *NPRM* itself admits, there are forms of discrimination that promote consumer welfare.[61] Consider, for example, price discrimination. Ramsey pricing is expressly designed to maximize consumer welfare, and it requires discrimination in the form of charging

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58 Comments of BT Americas Inc. on Behalf of Itself and Other BT Entities, *In the matter of Broadband Industry Practices*, WC Docket No. 07-52, June 15, 2007, at 9-11; Comments of the Consumer Federation of America, Consumers Union and Free Press, *In the matter of Broadband Industry Practices*, WC Docket No. 07-52, June 15, 2007, at 110-118, 120.

59 *NPRM*, ¶103.

60 This is the important distinction between harming competition and harming a competitor.

61 *NPRM*, ¶103.

different prices for the same service depending upon consumer's demand for the service.[62] By construction, Ramsey pricing is a form of price discrimination that benefits consumers. Roman Inderst and Tommaso Valletti have developed a model in which they analyze the short- and long-run implications of third-degree price discrimination in input markets.[63] They find that a ban on discrimination "stifles incentives to invest and innovate."[64] Examples from other industries also illustrate the potential value of discrimination. For example, student discounts for software packages can increase adoption. Similarly, the practice of selling pharmaceuticals for lower prices in developing countries can make drugs available that would otherwise be financially out of reach for citizens of those nations. And, as has been observed by Jonathan Baker, "Price discrimination and related practices like producing products in multiple versions are often a natural way to recover the high fixed costs of information technology."[65]

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62 Dennis Carlton and Jeffrey Perloff (2005), *Modern Industrial Organization* (Fourth Edition), at 702. ("The regulatory prices that maximize consumer welfare subject to the requirement that revenues cover costs is called Ramsey pricing….This solution is similar to optimal monopoly price discrimination.")

63 Broadband access can be viewed as an input into the production of online application services or as an input into the goods and services produced by business end users of broadband Internet access services.

64 Roman Inderst and Tommaso Valletti (2009), "Price discrimination in input markets," *RAND Journal of Economics*, **40**(1): 1–19, at 1.

65 Jonathan B. Baker (2003), "Competitive Price Discrimination: The Exercise of Market Power Without Anticompetitive Effects (Comment on Klein and Wiley)," *Antitrust Law Journal*, **70**(3): 643-54, footnote 6, citing Carl Shapiro and Hal Varian, *Information Rules: A Strategic Guide to the Network Economy*, (1999) at 18–91.

Baker also observes (at 654) that "When entry is free, price discrimination is not harmful and the outcome is reasonably termed competitive. Whether or not entry is easy, moreover, price discrimination can be beneficial."

63. In addition to generating revenues to cover fixed costs, price discrimination can generate revenues that may incent investment. In comments filed with the Commission, the U.S. Department of Justice cautioned against price regulation because it could undermine investment incentives.[66] Prohibiting price discrimination is a form of price regulation that can harm the returns to investment and, thus, investment incentives.

64. Turning to the specific practices with which the *NPRM* is concerned, the Commission states that

> We understand the term "nondiscriminatory" to mean that a broadband Internet access service provider may not charge a content, application, or service provider for enhanced or prioritized access to the subscribers of the broadband Internet access service provider, as illustrated in the diagram below. We propose that this rule would not prevent a broadband Internet access service provider from charging subscribers different prices for different services.[67]

It appears that the aim of this definition is to ban two-sided pricing strategies under which a broadband Internet access provider would charge both consumers and content/application providers and would offer a menu of services with varying prices and service qualities. However, as will be discussed below, such two-sided pricing strategies can promote economic efficiency and consumer welfare. Moreover, a ban on such pricing can be expected to have adverse unintended effects.

1. The proposed rule is incoherent and poorly defined.

65. Before discussing the consumer benefits of two-sided pricing strategies, observe that there is a fundamental inconsistency or circularity in the Commission's proposed rules. The

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66 *Justice Department Ex Parte Submission* at 28.

67 *NPRM*, ¶ 106.

quotation above makes a fundamental distinction between a "content, application, or service provider" and a "subscriber." Yet elsewhere in the *NPRM*, the Commission states that

> We propose not to adopt a specific definition of "content, application, or service provider," because any user of the Internet can be such a provider. For example, anyone who creates a family website for sharing photographs could be reasonably classified as a "content provider."[68]

66. The quotations in the two previous paragraphs raise the following questions: What if a broadband Internet access service provider required content, application, or service providers to become subscribers in order to receive enhanced or prioritized access? Would the broadband Internet access service provider then be allowed to charge them different prices for different services? If not, whom could it charge? Or what if a major content provider became a subscriber to a particular broadband Internet service access provider and then purchased priority access to all of the service provider's other subscribers? One could attempt to dismiss such questions as mere wordplay. But, in fact, these questions demonstrate a fundamental incoherence to the proposed rules that results from attempts to draw distinctions that lack a sound logical or factual basis.

67. As a general matter, it is far from evident that any set of rules could account for all of the possible means of paying for faster service. For example, public peering points are often congested, but private peering points are subject to private negotiations concerning capacity and compensation. Would the proposed rules require that all peering among broadband Internet access service providers be settlement free? And how would the rules treat caching services, such as those provided by Akamai and others, that have the effect of speeding up

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[68] *NPRM*, ¶ 99.

traffic? Would the proposed rules draw distinctions based on the identity of the company providing the services? For example, Verizon offers a service that allows connections at favorable locations that have the effect of speeding up traffic.[69] If Netflix asked Verizon to set up servers in major central offices around the country in order to speed up their video offerings, or asked to peer with Verizon in locations that would bypass congested routes, could Google successfully file a complaint that Verizon was discriminating in favor of Netflix and against YouTube?

2. Two-sided pricing can benefit consumers.

68. Absent a prohibition by the Commission, two-sided pricing could play an important role in promoting the widespread adoption of broadband services. Specifically, network operators might use revenue from arrangements with online service or application providers to subsidize the costs of consumer access, which would increase adoption.[70] A network operator could even adopt a business model similar to advertiser-supported over-the-air television broadcasting whereby consumers would receive access for free. Or, a network operator could use the revenues from differentiated arrangements with online service or application providers to offer discounted rates to consumers. Given the widespread recognition that cost can be an obstacle to consumer adoption of broadband, an application-

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69 See Verizon News Release, "Verizon Offering Pricing Incentives to Content-Delivery Network Providers to Connect Directly to Company's Internet Backbone Network," Verizon Website, January 7, 2009, *available at* http://www22.verizon.com/wholesale/newscenter/news_010709/, *site visited* January 8, 2010.

70 This benefit of two-sided pricing does not rely on altruism by the network provider. The ability to collect fees from application providers would lower the marginal cost of serving consumers, possibly to the point where effective marginal costs would be negative. The forces at work are similar to those that lead Google to offer consumers search services without charge.

provider-supported broadband service model could be an important component of an overall approach to increasing broadband penetration. Two-sided pricing could be a particularly valuable means of promoting broadband adoption if access providers are able to develop a targeted offering that is particularly attractive to underserved groups.

69. In a theoretical analysis of two-sided pricing, Benjamin Hermalin and I examined the effects of preventing a network operator from charging application providers a menu of prices for different grades of service providing access to end users. Our central findings were that blocking a network operator from offering a menu of services

> results in: (a) application providers that would otherwise have purchased a low-quality variant being excluded from the market; (b) applications "in the middle" of the market purchasing a higher and more efficient quality; and (c) applications at the top of the market purchasing a lower and less efficient quality. We find that the net welfare effects can be positive or negative, although the analysis suggests to us that harm is the more likely outcome. Moreover, applications at the bottom of the market—the ones that a single-product restriction is typically intended to aid—are almost always harmed by the restriction, and consumers have fewer applications available to them as a consequence.[71]

3. The managed or specialized services exception should be meaningful and should avoid becoming a success tax.

70. In the *NPRM,* the Commission states that

> We believe that the proposed nondiscrimination rule, subject to reasonable network management and understood in the context of our proposal for a

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[71] Benjamin E. Hermalin and Michael L. Katz (2007), "The Economics of Product-Line Restrictions With an Application to the Network Neutrality Debate," *Information Economics and Policy,* **19**(2): 215-248, at 236.

Glen Weyl recently developed another theoretical model that sheds light on the difficulties of regulating two-sided prices and provides "a further rationale for allowing price discrimination in two-sided markets." (E. Glen Weyl, "A Price Theory of Multi-Sided Platforms," *American Economic Review*, forthcoming.)

> separate category of "managed" or "specialized" services (described below), may offer an appropriately light and flexible policy to preserve the open Internet.[72]

To the extent that the managed or specialized service category would allow service providers to avoid the discrimination rule, the harms from the rule would be reduced. However, it should be noted that, to the extent that there are costs associated with qualifying a service as managed or specialized, the harms of the non-discrimination rule would not be eliminated entirely. To avoid these harms, the Commission would have to adopt rules that allowed providers to offer any service they want in addition to traditional Internet access without additional regulatory obligations or limits.

71. Unfortunately, it seems that a more likely scenario is that the Commission will define the category of managed or specialized services in such a way that it is difficult and or costly for services to qualify. Were this likelihood to become reality, the glaring lack of a sound basis for asserting that the anti-discrimination rules distinguishes practices that benefit consumer welfare from those that harm it would be even more troubling.

72. Even if the Commission does create a managed services exception, there is a very real danger that this policy will impose service qualifications that result in the rules' becoming a form of success tax. Specifically, the Commission states that it is "sensitive to any risk that the growth of managed or specialized services might supplant or otherwise negatively affect the open Internet."[73] The implication of the Commission's discussion on this point is that any service that became too successful might find itself disqualified from the managed-services

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[72] *NPRM*, ¶ 108.

[73] *NPRM*, ¶ 149.

exception and, thus, more heavily regulated. In this way, the policy would punish or tax investment and innovation that successfully satisfied consumer demands and, consequently, enjoyed high levels of consumer patronage. Additionally, as with the uncertainty regarding the definition of reasonable network practices, the uncertainty regarding when and how a service would qualify for the managed services exemption could adversely affect access providers' incentives to undertake activities that would otherwise benefit consumers.

73. Lastly, the *NPRM*'s call for specificity by those seeking a managed or specialized services exception merits comment. The *NPRM* asks

> commenters to be as specific as possible about the current or likely future identity of such offerings; their technical characteristics, including whether they traverse more than one service provider's network; the technical characteristics of any enhanced quality of service offering that might be required for such content, application, or service; and sales and marketing arrangements for such content, application, or service, as well as for any enhanced quality of service offering (*e.g.*, are or would such offerings be sold or marketed as part of other services or as a distinct service, whether bundled or stand-alone?)[74]

The call for such detail runs completely counter to the idea of promoting innovation and the notion that the great value of broadband is that it can support unexpected new applications.

74. More important, a definition of the class of managed services that attempted this level of specificity would be unworkable and would limit consumer choice by preventing the general purpose technology of broadband access from being used for the full range of possible purposes. Given marketplace dynamics and the pace of innovation, it does not make sense to create a carve-out solely for specific, rigidly defined services. Nor does it make sense to tie

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[74] *NPRM*, ¶ 150.

the definition to the use of a public IP address.[75] This approach to defining Internet services could, for example, block potentially life-saving applications such as remote health monitoring that required a low price and/or high quality of service and would not be commercially viable if it were forced by regulation to offer full Internet access.

C. THE RULES WOULD DISTORT COMPETITION IN OTHER WAYS AND HARM CONSUMERS

75. Network management, vertical contracting (including vertical integration), and sophisticated pricing can be key components of both an established service provider's ability to attract and retain customers and an entrant's strategy for achieving commercial viability. Instead of promoting competition, public policy restrictions on these practices can distort and diminish competition.

76. For example as I have discussed elsewhere, competition between different business models is an important form of competition in the mobile wireless industry.[76] There is no evidence that any particular model of an "open" platform with one-sided pricing and limited network management is the only or best way to facilitate innovation, investment, and consumer welfare. Apple's iPhone provides an excellent example of a managed system that has been extremely successful in meeting consumer demands. Apple's immensely popular

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75 The *NPRM* defines broadband Internet access as "Internet Protocol data transmission between an end user and the Internet." The Internet is defined as the "system of interconnected networks that use the Internet Protocol for communications with resources or endpoints reachable, directly or through a proxy, via a globally unique Internet address assigned by the Internet Assigned Numbers Authority." (*NPRM*, Appendix A)

76 *Katz Innovation White Paper,* § II.

app store currently has more than 100,000 applications available.[77] It would be a sad irony indeed, if the business model that has attracted consumer interest to a degree unprecedented in the mobile wireless industry were condemned by Commission policy as not being consumer friendly. In addition to the benefits that the iPhone has brought to consumers directly, it has also spurred competitive responses from a wide range of wireless carriers, handset manufacturers, and operating system manufacturers. Public policies should not unduly restrict suppliers' choices of business models in the mobile wireless marketplace. By far the most likely effects of public policies that impose sweeping restrictions on these choices will be to reduce innovation and investment, to consumers' detriment.

77. Clearwire is an example of how market forces influence the choice of business model. In 2008, Clearwire partnered with Sprint to develop a 4G mobile wireless network based on WiMAX technology. Clearwire chose to develop a relatively open network because it believed that this openness would give it a competitive advantage. As Clearwire noted in its comments in another proceeding, "Clearwire adopted openness even in the absence of federal rules because openness is good for our business…[it] will increase network usage and revenues as our customers take advantage of a wide range of device and applications options."[78] Should Clearwire's business model prove to be effective, it will be rewarded by consumers in a competitive marketplace.

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[77] Apple, Inc. Press Release, "Apple Announces Over 100,000 Apps Now Available on the App Store," November 4, 2009, *available at* http://www.apple.com/pr/library/2009/11/04appstore.html, *site visited* January 8, 2010.

[78] Comments of Clearwire Corporation, *Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan For Our Future*, GN Docket Nos. 09-157, 09-51, September 30, 2009, at 6.

78. As I have discussed elsewhere, various forms of vertical contracting, including vertical integration and different forms of exclusivity arrangements, can promote competition, innovation, and investment in both network infrastructure and complementary equipment and applications.[79] Vertical contracts provide a means for parties to commit to dealing with one another and, thus, such contracts can increase the incentives for the parties to invest in their economic relationship. The proposed rules could stifle relationship-specific network investment as network operators find it much less attractive to make investments in their networks to support specific applications.

79. In closing this discussion, it should be noted that business models entailing less integration and management may prove to be the most successful at meeting consumer demands. However, this is not the only possibility, as Apple itself demonstrates. Consumers would not be well-served if the Commission imposed on the market what the Commission currently views as the best business model. Consumers are best served by public policies that allow carriers, application providers, and equipment manufacturers to compete using a variety of business models in order to see which model or models best succeed in attracting customers.

D. THE RULES OFFER LITTLE OR NO INCREMENTAL BENEFIT OVER EXISTING LAWS AND REGULATIONS

80. The potential incremental benefits of the *NPRM*'s proposed rules are diminished by the existence of state and federal laws and public policies of general applicability that already provide fundamental protections of competition and consumer welfare. In particular, the

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[79] *Katz Innovation White Paper,* § IV.C. and *Katz Broadband Declaration,* §§ III, IV, and V.

effects of the proposed rules must be examined in the light of existing antitrust and consumer protection policies and institutions.

81. Perhaps the most coherent concerns expressed by proponents of net neutrality regulation have to do with the threat of discrimination by a vertically integrated firm against a competitor. If any such action raises serious competitive concerns, then it can and should be addressed using existing antitrust laws. Those laws are well understood and do not create any additional regulatory uncertainty. If the behavior is not so serious as to raise concerns under antitrust laws, then it does not justify imposing additional regulations in an area that has done well with regulators making a point of trying not to interfere.

82. Transparency regarding network management practices can promote competition and consumer welfare by allowing consumers to make better-informed choices. However, it does not follow that Commission-mandated transparency regulations will best serve consumer interests.

83. There are several issues that must be considered in order to develop a pro-consumer approach to transparency. First, the potential incremental benefits of additional broadband-specific regulations are smaller to the extent that existing state and federal laws and public policies of general applicability already provide fundamental consumer protections. Additional rules may be redundant or may conflict with existing rules. Instead of creating new rules, a preferable approach may be to encourage development of a voluntary industry code of conduct, which would provide greater flexibility and would lack the power to conflict with existing laws and regulations.

84. The Commission would face many difficult issues if it were to undertake the regulation of service-provider disclosure. It certainly is a good principle that broadband service providers should not mislead their users. But suppose a broadband service provider adopted the following policy: "At our discretion, we will block high-bandwidth applications." Moreover, suppose that the service provider was able to attract a large number of consumers after publicly stating and widely publicizing its policy. Assuming that this policy would not run afoul of the non-discrimination rule, would that level and type of disclosure be sufficient to satisfy the proposed transparency rule? There would be no deception by the service provider and, by hypothesis, large numbers of consumers would be satisfied with the policy. Or would the company have to disclose an exact algorithm that anyone could use to predict precisely when the company would limit a high-bandwidth or harmful application? If the Commission interprets the rule as requiring additional disclosure, how much detail would be enough? And when would the Commission reveal that threshold to service providers? The Commission would have to address these and many other issues if it intends to regulate disclosure.

85. The difficult nature of the issues increases the likelihood of adverse unintended consequences. For example, the U.S. Department of Justice warns that some forms of disclosure regulation could distort or limit competition, to the detriment of consumers.[80]

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[80] *Justice Department Ex Parte Submission* at 27.

86. Lastly, there is a very real question of whether the Commission should be the agency to impose any such rules. The Federal Trade Commission has the ability to go beyond sector-specific rules. A considerable advantage of economy-wide rules is that a well-developed body of case law and precedent has already been developed. This established regime has the advantage of being relatively flexible while at the same time providing a less uncertain environment for investors and innovators than would a new set of sector-specific rules.

87. The U.S. Department of Justice has asserted that "[t]he Commission is uniquely situated to ensure more effective public disclosure of such data [regarding speeds and terms of service] and should use its authority to do so."[81] The relevant question is not whether the Commission is uniquely situated, but rather whether there is anything that the Commission is uniquely positioned to do in this area that can be expected to promote competition and consumer welfare. One thing that the Commission could do—and should do before imposing any new rules—would be to survey the current availability of information, including disclosures by broadband Internet access providers as well various decision-support tools provided by third parties, such as web sites that offer comparative statistics regarding the actual speeds achieved using different service providers.

The Department points to food labeling as an example of successful disclosure regulation. (*Justice Department Ex Parte Submission* at 27.) However, several studies have demonstrated that food labeling has had unintended adverse consequences. (For a summary of some of this research, see *Katz Broadband Declaration,* Appendix: Food Labeling and Unintended Consequences.)

[81] *Justice Department Ex Parte Submission* at 25.

E. A CONSUMER-ORIENTED POLICY WOULD NOT SINGLE OUT BROADBAND INTERNET SERVICE PROVIDERS FOR APPLICATION OF THE PROPOSED RULES

88. In the *NPRM,* the Commission states

> Although the question of Internet openness at the Commission has traditionally focused on providers of broadband Internet access service, we seek comment on the pros and cons of phrasing one or more of the Internet openness principles as obligations of other entities, in addition to providers of broadband Internet access service. [Internal footnote omitted].[82]

The Commission is right to seek comment on this issue. Treating broadband Internet access service providers differently than other service and application providers distorts markets, creates artificial—and unproductive—boundary lines, and risks distorting competition by favoring certain business models over others. Instead, public policy should attack anticompetitive behavior in any part of the industry. For example, operating systems, search, and many web applications are highly concentrated and there is the possibility that some providers of these products and services might have incentives to undertake anticompetitive actions, such as certain forms of price discrimination or exclusionary behavior.

89. It is very important to recognize, however, that the fact that broadband Internet service providers should not be singled out for differential treatment does *not* imply that some version of the proposed rules should be applied to other entities in the broadband industry. It is essential to the promotion of consumer welfare that policy makers limit intervention to the prevention of *anticompetitive* behavior and that they take costs—including the likely costs of unintended consequences—and the presence of existing antitrust and regulatory policies into account before enacting new rules. Many or all of the arguments against application of the

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82 *NPRM,* ¶ 101 [Internal footnote omitted].

proposed rules to broadband Internet service providers would apply to application of the rules to other sectors of the industry as well.

V. APPLICATION OF THE PROPOSED RULES WOULD BE ESPECIALLY LIKELY TO HARM WIRELESS CONSUMERS

90. Imposition of the set of proposed rules to wireline broadband services would distort competition and harm consumers. Application of these rules to wireless broadband service providers poses an even greater threat to consumer welfare. Certain of the rules would be especially harmful.

A. REASONS WHY APPLICATION OF THE PROPOSED RULES WOULD BE ESPECIALLY HARMFUL FOR WIRELESS CONSUMERS

91. There are at least three broad reasons why application of the proposed rules would be especially harmful for mobile wireless consumers.

1. Competitive market forces already promote consumer welfare.

92. Today, several different competitors offer a variety of wireless data and Internet access services. The popularity of smart phones has grown dramatically. The Pew Internet & American Life Project survey in April 2009 found that 17 percent of non-rural households (and 19 percent of rural households) with residential broadband Internet access obtained their service from a wireless (including satellite) provider, up from 8 percent in 2007.[83] Fixed wireless offerings are available in every state.[84]

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83 John Horrigan, "Home Broadband Adoption 2009," Pew Internet & American Life Project, June 2009, at 21 and 22.

84 *CITI* at A-40.

93. Network operators continue to invest in higher capacity networks offering greater speeds. For example, the Columbia Institute for Tele-Information's report for the Commission has noted that a new generation of high-throughput satellites is expected to launch in 2011 and 2012 and will offer speeds from 2 to 25 Mbps.[85] According to CITI, analysts expect that more than half of the U.S. population will use a 3G or 4G wireless broadband service by the end of 2013.[86] AT&T has announced that its 3G network is being upgraded to High Speed Packet Access (HSPA) 7.2 technology, which offers "theoretical peak speeds" up to 7.2 Mbps.[87] T-Mobile is also upgrading its network to HSPA.[88] And HPSA+ is projected to provide peak downlink speeds of 20 Mbps or more.[89] 4G networks are being deployed that will offer significantly greater speeds than today's 3G networks. Some of those networks are already operational. Sprint advertises average download speeds of 3 to 6 Mbps and peak download speeds of up to 10 Mbps.[90] Similarly, Clearwire's CLEAR service

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85 *CITI* at 57.

86 *CITI* at 59.

87 AT&T, "AT&T to Deliver 3G Mobile Broadband Speed Boost," May 27, 2009, *available at* http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=26835, *site visited* January 6, 2010.

88 UMTS Forum, "Mobile broadband moves into the fast lane as HSPA+ launches gather pace," July 24, 2009, *available at* http://www.3gamericas.org/documents/HSPA%20plus%20deployments%2024%20July%20FINAL.pdf, *site visited* January 6, 2010.

89 "T-Mobile Upgrades to HSPA 7.2Mbps, First to Deploy HSPA+," posted on Phone Scoop by Eric M. Zeman, January 5, 2010, *available at* http://www.phonescoop.com/news/item.php?n=5310, *site visited* January 6, 2010.

90 Sprint, "The Difference Between 3G and 4G," *available at* http://www.nextel.com/en/solutions/mobile_broadband/mobile_broadband_4G.shtml, *site visited* January 7, 2010.

currently advertises "average download speeds of 3 to 6 Mbps with bursts over 10 Mbps."[91] The International Telecommunications Union has targeted much higher speeds in the future.[92] Many other wireless access competitors are expected to deploy 4G in the next few years, including AT&T, Comcast, Cox, Open Range, T-Mobile, and Verizon Wireless.[93]

94. With 4G technology, wireless Internet access speeds are comparable to those of a typical fixed-line connection and the two modes of access can be expected to compete with one another. According to Akamai, the average connection speed in the U.S. was 3.8 Mbps, and very few consumers have connections with speeds greater than 25 Mbps.[94] Similarly, Speedmatters.org found that only 19 percent of Americans with Internet connections have connections with speeds greater than 10 Mbps.[95] According to the U.S. Department of Justice, "Emerging fourth generation ('4G') services may well provide an alternative

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91 Clearwire, "CLEAR Is Internet on Your Terms," *available at* http://www.clear.com/discover/network, *site visited* January 7, 2010.

92 See, for example, International Telecommunications Union, "ITU Global Standard for International Mobile Telecommunications 'IMT-Advanced,'" International Telecommunications Union Website, *available at* http://www.itu.int/ITU-R/index.asp?category=information&rlink=imt-advanced&lang=en, *site visited* December 31, 2009.

93 *CITI*, Appendix A.

94 Akamai, "The State of the Internet," 2nd Quarter 2009, **2**(2) *available at* http://www.akamai.com/stateoftheinternet/, *site visited* January 8, 2010, at 26 and 29.

95 Communications Workers of America, "A Report on Internet Speeds in All 50 States," August 2009, *available at* http://cwafiles.org/speedmatters/state_reports_2009/CWA_Report_on_Internet_Speeds_2009.pdf, *site visited* January 7, 2010, at 2.

sufficient to lead a significant set of customers to elect a wireless rather than wireline broadband service."[96]

95. As discussed above, competition provides incentives for service providers to adopt network management practices and business models that promote consumer welfare. The competitive structure of the wireless marketplace thus reduces the potential benefits of regulation relative to the free-market outcome.

96. Given the strength of competition, there is relatively little reason to believe that pervasive regulatory intervention will improve market performance. However, as will now be discussed, there are significant reasons to believe that the proposed regulation will worsen market performance and harm consumers.

2. Public policies that limit wireless network management are especially harmful.

97. Network management is important to the successful operation of any communications network. Network management is especially important for wireless networks, which face even greater capacity constraints than wireline networks due to the necessity of sharing spectrum resources. Moreover, networks offering mobile services face particularly complex operational issues, such as the interaction of the network with millions of mobile transceivers that must be monitored from multiple locations and handed off between different access points. Further, the nature of mobile access devices may make network management

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[96] *Justice Department Ex Parte Submission* at 8.

The Department also opined that "It is premature to predict whether the wireless broadband firms will be able to discipline the behavior of the established wireline providers, but early developments are mildly encouraging." (*Justice Department Ex Parte Submission* at 10.)

practices regarding security and protection from viruses, worms, and other malware particularly valuable. Consumers will benefit if wireless network operators are allowed to undertake network management without undue public policy restrictions.

3. Public policies that attenuate broadband mobile wireless network investment incentives will be especially harmful.

98. Imposition of the *NPRM*'s proposed rules would be expected to attenuate investment incentives, harming competition and consumers.

99. The *NPRM* attempts to minimize such concerns by noting that the Commission imposed openness requirements in the 700 MHz C Block auction and was able to find a bidder that met the Commission's reserve price.[97] However, the *NPRM* does not discuss the more important characteristic of that auction outcome: the large, negative impact of these requirements on the license price. This fact is important because the bids for a license reflect the economic value that bidders anticipate being able to derive from use of the spectrum (*i.e.*, the expected profits to be earned from services provided using that spectrum and complementary investments). As that value falls, the associated bids will also fall. Thus, the

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[97] *NPRM*, ¶¶ 42, 161.

The *NPRM* (¶169) also notes that there are differences between the rules proposed in the *NPRM* and the rules the Commission adopted for Upper 700 MHz C Block licensees. For example, the *NPRM* states that the "any device rule" and "any application rule" proposed in the *NPRM* would apply to a provider of broadband Internet access service, while the C Block license rules imposed such obligations on licensees offering *any* service on Upper 700 MHz C Block spectrum. However, as discussed elsewhere in the present declaration, the *NPRM* provides little guidance and no assurance concerning the extent to which managed services will be exempted, creating uncertainty and potentially decreasing the expected returns from investment. Moreover, the *NPRM*'s proposed rules would go beyond the conditions attached to the Upper 700 MHz C Block licenses to cover commercial relationships between access providers and content providers. See, 47 CFR Ch. 1 (10-1-08 Edition) § 27.16(a); Federal Communications Commission, "700 MHz Band Second Report and Order," FCC 07-132 (rel. August 10, 2007), ¶ 222.

fact that the openness requirements appear to have dramatically reduced the C-Block license prices is evidence that the openness requirements significantly reduced the returns to investment associated with that spectrum. Specifically, the unrestricted B Block, which was also licensed in Auction 73, sold for $2.67 per per megahertz per covered person, while the C Block sold for less than one third as much per megahertz per covered person, $0.76.[98] The only block to sell for less than the C Block was the E Block, which contained only six megahertz of unpaired spectrum.[99] The D Block, which had even more stringent conditions attached to it, did not sell at all because the bid failed to reach the reserve price.[100]

100. Because spectrum licenses can differ along several dimensions, it is necessary to make adjustments to insure an apples-to-apples comparison. One study that did so found that, relative to the baseline in which they were not applied, the openness requirements attached to the C-Block license reduced the winning bids by 40 percent and the expired profitability of the services provided with that license by 32 percent.[101] Although it is difficult to determine the precise effects, the experience of Auction 73 demonstrates that network neutrality

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98 Gregory S. Crawford, Evan Kwerel, and Jonathan Levy (2008), "Economics at the FCC: 2007–2008," *Review of Industrial Organization*, **33**(3): 187-210 (hereinafter, *FCC Economics Review*), Figure 2. For the underlying bidding data, see FCC, "Auctions Summary," *available at* http://wireless.fcc.gov/auctions/default.htm?job=auctions_all#completed, *site visited* January 6, 2010.

99 *FCC Economics Review*, Figure 2.

100 For additional discussion of these and other differences in the blocks that might have affected their license prices, see *FCC Economics Review*, § 2; George S. Ford, Thomas M. Koutsky, and Lawrence J. Spiwak, "Using Auction Results to Forecast the Impact of Wireless Carterfone Regulation on Wireless Networks," Phoenix Center Policy Bulletin No. 20, (Second Edition), May 2008.

101 George S. Ford, Thomas M. Koutsky, and Lawrence J. Spiwak, "Using Auction Results to Forecast the Impact of Wireless Carterfone Regulation on Wireless Networks," Phoenix Center Policy Bulletin No. 20, (Second Edition), May 2008.

regulations can dramatically lower expected network profits. Whatever one thinks of the potential benefits of network neutrality regulations, those benefits must be weighed against the resulting loss of investment incentives.

101. Free Press recently released a report in which the author claims to demonstrate that network neutrality regulations do not meaningfully harm investment incentives.[102] Scrutiny of the study, however, reveals that it is fatally flawed and offers no such demonstration.

102. The principal empirical basis of the study's claim is an examination of AT&T's investment behavior following its merger with Bell South.[103] As part of gaining Commission approval of the merger at the close of 2006, AT&T agreed to abide by network neutrality principles for two years. The Free Press study presents data indicating that investment by AT&T rose from 2006 to 2008 both in absolute terms and as a percentage of revenues.[104] The study also observes that some telecommunications companies invested smaller percentages of their revenues or had lower rates of growth in their investment amounts than did AT&T, although other companies invested more.[105]

103. A fundamental flaw in the Free Press study is that it does not establish a plausible counterfactual to serve as a benchmark for measuring the effects of AT&T's commitments. In doing so, Free Press study ignores several factors that clearly could affect AT&T's

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102 S. Derek Turner, "Finding the Bottom Line: The Truth about Net Neutrality & Investment," Free Press, October 2009 (hereinafter, *Free Press Study*).

103 The *Free Press Study* ignores the evidence provided by the C Block auction just discussed.

104 *Free Press Study* at 5, 6, and 9.

105 *Free Press Study* at 6.

investment levels, including the merger itself as well as other commitments made by AT&T in seeking Commission approval.[106] Moreover, the Free Press study ignores the facts that investments decisions are made with a lag and are driven by long-term considerations. An agreement reached in 2006 would not be expected to have its full impact in the following year. Even more important, AT&T would rationally anticipate that investments made in 2007 and 2008 would be free of the transitory commitments over most of the lives of the invested assets. Hence, AT&T's commitments would be expected to have relatively small impacts on the returns from AT&T's investments and would have a much smaller impact on investment levels than would permanent network neutrality rules.

104. The Free Press study also asserts that network neutrality regulation would not harm investment incentives because Clearwire, Cellular South, and XO Communications support the network neutrality regulation and Clearwire is making significant investments without apparent concern that network neutrality will harm the return to its investment.[107] Far from supporting network neutrality regulation, however, these facts demonstrate that different companies have different business models and different assessments of the effects of network neutrality on the profitability of their business models.[108] This variety of business models and approaches to various notions of "openness" is beneficial given the heterogeneity of consumer preferences and the high degree of uncertainty about future technological developments and

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106 This point is forcefully made in George Ford, "Finding the Bottom: A Review of Free Press's Analysis of Network Neutrality and Investment," Phoenix Center, October 29, 2009, at 3 and 4. This paper also identifies other problems with the Free Press analysis.

107 *Free Press Study* at 10.

108 See also the discussion of Clearwire in Section IV.C above.

the evolution of consumer demand. This is yet another reason why an attempt to force all broadband access providers into a single mold would distort competition and very likely harm consumers.

105. In summary, evidence indicates that application of the *NPRM*'s proposed rules to wireless networks would significantly harm network investment incentives. Wireless broadband services are still in their infancy, and—in the absence of these rules—carriers are now making massive investments to begin deploying 4G technologies that will provide far greater speeds and potentially compete with existing fixed broadband pipes into the home. Moreover, the U.S. Department of Justice has highlighted the importance of continued investment by wireless broadband networks for competition in rural areas, stating that wireless broadband "appears to offer the most promising prospect for additional competition in areas where user density or other factors are likely to limit the construction of additional broadband wireline infrastructure."[109] This critical juncture in the industry's development would be an especially unwise time to risk the significant harms that the proposed rules would impose on investment incentives.

4. High Costs Plus Low Benefits Equal Consumer Harm

106. In summary, the technical constraints faced by mobile wireless networks increase the costs of public policies that hinder efficient network management and attenuate network investment incentives. The need for, and complexity of, wireless network management also makes it more likely that Commission regulation of network management will trigger those

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[109] *Justice Department Ex Parte Submission* at 8.

costs. At the same time, the competitive structure of the wireless marketplace leads to forces that drive service providers to benefit consumers in the absence of pervasive regulation. Thus, the costs of broadband wireless regulation are likely to be high and the benefits low.

B. SPECIFIC RULES ARE ESPECIALLY LIKELY TO HARM WIRELESS CONSUMERS

107. For the reasons just discussed, application of the proposed rules to mobile wireless broadband Internet access service providers is particularly problematic. This subsection considers two of the rules that would be especially harmful.

108. First, the Commission proposes that

> Subject to reasonable network management, a provider of broadband Internet access service may not prevent any of its users from running the lawful applications or using the lawful services of the user's choice.

This rule could create significant uncertainties for wireless providers. For example, how would access devices be treated by the proposed policy? Would devices be required to support all applications? If devices were not regulated, would mobile wireless broadband Internet access network operators and device manufacturers be allowed to reach contractual agreements with respect to the applications supported by the devices? How would a mobile wireless broadband Internet access provider that integrates into the supply of handsets be treated under this rule?

109. The proposed rule raises many other questions. For example, how would applications that might be lawful but are considered harmful or unwanted by consumers be treated? Could a mobile wireless broadband Internet access provider block an application that reported customer telephone numbers to a central database? This is more than merely a hypothetical concern. A maker of popular iPhone games was discovered to be accessing, collecting, and

transmitting consumer's phone numbers back to the game provider without the knowledge of the end user.[110] Apple has removed the applications from its store, but many iPhone users may still have the application on their phones. If AT&T could find a technological means of doing so, would the proposed rules allow AT&T to block the application's transmission of data from users' phones to the manufacturer?

110. The Commission also proposes that

> Subject to reasonable network management, a provider of broadband Internet access service may not prevent any of its users from connecting to and using on its network the user's choice of lawful devices that do not harm the network.

111. It is important to recognize that, on congested networks, "harm" should mean more than solely "physical harm." In many instances for example, wireless networks face serious capacity issues. Devices and applications that place high demands on the network can trigger dropped calls and handoff issues for other users.

112. The requirement that a network "not prevent any of its users from connecting to and using on its network the user's choice of lawful devices" is extremely vague in the case of a wireless network. Interpretation of this requirement raises several questions. For example, how far would a wireless network operator have to go to facilitate the use of other devices? Would the operator have to make public a proprietary RF interface? Would a network operator be allowed to charge customers or access device manufacturers license fees in those instances where the devices had to make use of proprietary network intellectual property in

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[110] Lex Friedman, "Lawsuit claims iPhone games stole phone numbers," *Macworld*, November 9, 2009, *available at* http://www.macworld.com/article/143725/2009/11/stolen_numbers.html, *site visited* January 7, 2010.

order to interoperate with the network? Would network investments to support features of specific handsets be allowed (*e.g.*, AT&T's investment to support the Apple iPhone's visual voice mail)? Would a wireless service provider be required to provide customer care for all devices without regard for whether the service provider had a commercial relationship with the device manufacturer or even had the requisite knowledge to provide customer care for those devices? If not, would the service provider have to offer a discount to customers using non-supported devices on the grounds that these customers would not be using customer service and to charge them the same price would constitute discrimination?

113. The *NPRM* asks several questions regarding mandatory tethering.[111] Instead of mandating tethering, the Commission could rely on competitive market forces. The market already offers a range of solutions. For example, Verizon offers tethering on a wide variety of handsets.[112] If the Commission adopts the "any device" requirement and applies it to wireless access, then the Commission should declare that a wireless access provider that offered meaningful tethering options would be in compliance with the "any device" requirement. By

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111 Specifically,

> Should we require providers to allow "tethering" as a form of device interconnection? If we required wireless providers to permit tethering, what impact would that have on wireless network congestion, and what reasonable network management measures should providers be allowed to take to ensure that their networks can support tethering? Alternatively, should a tethering requirement be sufficient to satisfy the "any device" requirement in the wireless context?

NPRM, ¶ 167.

112 Verizon Wireless, "Mobile Broadband Connect Devices," *available at* http://support.vzw.com/capability/mobile_broadband_connect_devices.html, *site visited* January 7, 2010.

doing so, the Commission would avoid several of the difficult interface issues discussed in the previous paragraph.

114. If the Commission mandates tethering, then the Commission should also allow carriers to set prices that reflect the different data usage and traffic patterns of users that do and do not engage in tethering. Doing so would be one means of promoting efficient network usage and of having prices that are fair in the sense that those users who impose greater costs on the network pay more. Charging higher fees to those users who consume more capacity is not "discrimination" in any economically meaningful sense.

115. Handset subsidies are another pricing issue triggered by the *NPRM*'s proposed "any device" rule. In theory, such subsidies could be used to subvert the "any device" rule (*e.g.*, a wireless network operator could set its service prices at high levels while setting the prices of select handset at very low levels, thus making it difficult for other handsets to compete). Hence, the "any device" rule might be interpreted as implying that handset subsidies are either subject to some sort of cap or flatly prohibited. Doing so, however, would risk harming consumers and reducing the adoption of broadband services. This risk arises because access device costs are a barrier to the more widespread use of broadband services.[113] If regulation

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[113] For example, survey research conducted by Connected Nation found that many consumers do not have broadband access because they do not own computers and that the up-front cost of a computer is a barrier to ownership. (Connected Nation, "Consumer Insights to America's Broadband Challenge," October 13, 2008, *available at* http://connectednation.org/research/Americas_Broadband_Challenge.php, *site visited* January 9, 2010, §§ I and V.)

In the National Broadband Plan proceeding, many commenters identified the value of demand-sided initiatives to promote broadband adoption; the recommended initiatives included discounts and/or subsidies for computers and other access devices. (Reply

allows them to be offered, handset subsidies can help overcome the cost barrier and promote adoption. Moreover, handset subsidies are very popular with consumers. For example, when

> Apple and AT&T started offering the iPhone for $199, plus $30 a month for Internet access, sales shot up, even though the previous deal - $399 for the phone and $20 a month – cost less over a two-year contract.[114]

Hence, an important question is whether mobile wireless providers would be allowed to subsidize specific handsets under the Commission's proposed rules?

116. Lastly, although the proposed rule blocking discrimination would be a serious concern for all types of Internet access, it is a particularly serious concern for mobile wireless. This is so because the greater costs of capacity make two-sided pricing strategies and charging application providers for access particularly important for promoting consumer welfare.

VI. CONCLUSION

117. The Commission should employ a pro-consumer approach to policies that address the broadband industry. In order to benefit consumers, the costs and harms associated with the proposed rules would have to be outweighed by any incremental benefits to society of imposing sector-specific regulation on top of existing antitrust and consumer protection regulation. There are compelling reasons to conclude, however, that the proposed rules would generate harms, not benefits. Instead of imposing the rules, the Commission should continue to monitor the industry to determine whether there are widespread problems for

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Comments of Intel Corporation, *In the Matter of A National Broadband Plan for Our Future*, GN Docket No. 09-51, July 21, 2009.)

[114] Saul Hansell, "Is There a Method in Cellphone Madness?," *The New York Times*, November 15, 2009, *available at* http://www.nytimes.com/2009/11/15/business/15price.html, *site visited* January 7, 2010.

which existing policies are insufficient. To date, the record does not establish that such problems exist.

118. A pro-consumer approach to policies that address the broadband industry would rely primarily on competitive market forces to deliver innovation and investment with an antitrust and consumer protection backstop to correct situations in which the market can be shown to have failed. That is, the Commission should let consumers choose what they want, not mandate the choices to be offered. The Commission's proposed rules would harm consumers by distorting competition and attenuating innovation and investment incentives.

I declare, under penalty of perjury, that the foregoing is true and correct.

Michael L. Katz

January 9, 2010

APPENDIX: QUALIFICATIONS

119. I hold the Sarin Chair in Strategy and Leadership at the University of California, Berkeley, where I serve as Director of the Institute for Business Innovation and have a joint appointment in the Haas School of Business Administration and the Department of Economics. I have also served as the Harvey Golub Professor of Business Leadership at New York University's Stern School of Business and on the faculty of the Department of Economics at Princeton University. I received my A.B. from Harvard University *summa cum laude* and my doctorate from Oxford University. Both degrees are in Economics.

120. I specialize in the economics of industrial organization, which includes the study of antitrust and regulatory policies. I regularly teach courses on microeconomics and business strategy. I am the co-author of a microeconomics textbook, and I have published numerous articles in academic journals and books. I have written academic articles on issues regarding the economics of network industries, systems markets, antitrust enforcement, and telecommunications policy. I am recognized as one of the pioneers in extending the theory of network effects to competitive settings. I am a co-editor of the *Journal of Economics & Management Strategy* and serve on the editorial boards of *Information Economics and Policy* and the *Journal of Industrial Economics*.

121. In addition to my academic experience, I have consulted on the application of economic analysis to issues of antitrust and regulatory policy. I have served as a consultant to both the U.S. Department of Justice and the Federal Communications Commission on issues of antitrust and regulatory policy. I have served as an expert witness before state and federal

courts. I have also provided testimony before state regulatory commissions and the U.S. Congress.

122. From January 1994 through January 1996, I served as the Chief Economist of the Federal Communications Commission under the Clinton Administration. I participated in the formulation and analysis of policies toward all industries under Commission jurisdiction. As Chief Economist, I oversaw both qualitative and quantitative policy analyses.

123. From September 2001 through January 2003, I served as the Deputy Assistant Attorney General for Economic Analysis at the U.S. Department of Justice under the Bush Administration. I directed a staff of approximately fifty economists conducting analyses of economic issues arising in both merger and non-merger enforcement. Our principal professional focus was on understanding and projecting the impacts of various business practices and public policy decisions on consumers' economic welfare. My title as Deputy Assistant Attorney General notwithstanding, I am not an attorney.